1. **Bucket Sort.** Bucket sort differs from insertion sort, selection sort, heap sort, merge sort, and quick sort because it does not use _____ comparisons _____.
   Assuming there are \( n \) elements to be sorted and that the bucket sort uses \( N \) buckets, the running time of bucket sort is _____ \( O(n + N) \) _____.

2. **True** or False: Bucket sort is a stable, in-place sort.

3. **Radix Sort.** Radix sort internally applies Bucket sort to lexicographically order a set of tuples. Assuming each of the \( n \) tuples have \( d \) dimensions and there are \( N \) buckets, the running time of radix sort is _____ \( O(d(n + N)) \) _____.

4. **True** or False: Radix sort is a stable sort and is not in-place.

5. **The Selection Problem.** The selection problem is to find the \( k \)th smallest element (also known as the \( k \)th order statistic) from a set of \( n \) elements.
   - The 1st order statistic is also known as _____ Minimum _____.
   - The \( n \)th order statistic is also known as _____ Maximum _____.
   - The \( \lfloor \frac{n}{2} \rfloor \)-nd order statistic is also known as _____ Median _____.

6. **True** or False: Given a sorted sequence of \( n \) elements stored in an array, the selection problem can be solved in \( O(1) \) time.

7. **QuickSelect.** QuickSelect is an algorithm that applies the prune-and-search paradigm. QuickSelect partitions the original problem of size \( n \) into _____ 1 _____ subproblems and spends _____ \( O(n) \) _____ time total to partition the problem into subproblems. QuickSelect runs in _____ \( O(n) \) _____ expected time.
   Write down the recurrence relation showing the best case running time of QuickSelect:
   \[
   T(n) = T\left(\frac{n}{2}\right) + O(n)
   \]

8. The best known selection algorithm runs in time _____ \( O(n) \) _____.